

preparations are here described, which, together with four others published in the previous volume, afford us an intimate knowledge of the minute structure of the endo-skeleton of this interesting form. Prof. Quekett states that the structure of its bone, as well as those portions of its skeleton which do not become ossified, are more closely allied to the corresponding tissues of the Batrachia than to those of any Fish yet examined; and as it undoubtedly possesses many characters peculiar to Fishes, a subdivision of the order Batrachia has been proposed for it, and that of Ichthyo-Batrachia appears to be most expressive of its peculiar affinities.

To the anatomist, palæontologist, and geologist engaged in microscopical research, this volume is of inestimable value, superseding as it does the necessity of obtaining a costly series of objects for examination and comparison. Few persons could have undertaken the preparation of a work requiring so much labour and nice manipulation of the numerous specimens illustrative of the various subjects, with any fair chance of equivalent remuneration. By the publication of this Catalogue, the Council of the College have afforded a boon to microscopical science, prepared as it has been by an author who has devoted so much time to, and prosecuted with such zeal and success, the practical bearings of histology.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

July 25, 1854.—John Gould, Esq., F.R.S., in the Chair.

NOTES ON THE HABITS OF SOME INDIAN BIRDS.—PART V.
BY LIEUT. BURGESS.

Family STURNIDÆ.

Subfamily STURNINÆ.

Genus PASTOR.

PASTOR ROSEUS, Temm. THE ROSE-COLOURED PASTOR.

This bird visits the Deccan in immense flocks to feed on the grain called *jowaree* which begins to ripen in the month of November, and is cut about March. The arrival of these birds is uncertain, in some years being earlier, in others later. On referring to notes made at the time, I find that in the year 1848 the first Rose-coloured Pastor was seen on the 28th of November, and the last on the 5th of April 1849. The first which I observed in the autumn of that year, was on the 16th of November. In the year 1850, I saw a large flock as early as the 24th of August; I transcribe the note: "August 24, 1850. Saw a large flock of the Rose-coloured Starlings with their broods to-day feeding in an open field, evidently on insects, as they were constantly in chase of them, flying." I never saw this bird so early as it was that year, and they arrived long before the *jowaree* was ripe. This grain when ripe, and before it is ripe, is their staple

food. After it is cut and housed, I have observed them busily feeding on the flowers of the leafless Caper, a shrub very common in many parts of the Deccan, especially on the banks of the larger rivers. I have made many, but hitherto ineffectual attempts, to ascertain where these birds breed; that they do breed somewhere on the continent of India, there can be no doubt, as the young birds which I saw on the 24th of August 1850, were in brown plumage, and appeared as if they had not long left the nest. I was informed by a clever and well-informed Mharatta, who seemed to have considerable knowledge of the habits of various birds, that the Rose Starling retires to the Ghauts to breed. On visiting those mountains in 1849, I made many inquiries of the hill people, but was unsuccessful in getting any information from them. However, I think it very probable that these birds, after leaving the Deccan in March and April, break up into pairs, and retire to the ravines and forests in the Ghauts to breed. Like the common Starling, these birds congregate in immense flocks before going to roost, and it is a curious sight to watch their movements as they fly in clouds over their night haunts. Towards sunset they begin to collect from the grain-fields, and fly off in detached parties, at first containing only a few individuals. These soon amalgamate, and form large masses, which, as they dash, now upwards and now downwards, now in circles, at one time almost disappear, at another look like a rapidly passing cloud. As soon as the sun is down, they retire to the babool brakes that clothe the banks of the streams and rivers. These birds collect in such numbers on the small bushes and trees on the outskirts of the grain-fields, as to make them appear as if loaded with rich, rosy blossoms, and to make one wonder that the tree is not broken down with their weight.

Family FRINGILLIDÆ.

Subfamily COCCOTHAUSTINÆ, Swain.

Genus EUPLECTES, Swain.

EUPLECTES (BENGALENSIS?).

I forwarded a paper on the nidification, habits, &c. of this little bird, together with specimens of the skins, nests and eggs, in the year 1852. The paper was read, and the specimens exhibited at the meeting of the Society on July 27th, 1852. Repetition therefore is needless.

Genus AMADINA, Swain.

Subgenus SPERMESTES.

SPERMESTES CHEET, Sykes.

This is a very common little bird, living in flocks, to be found in hedges and low bushes, and is, I believe, partial to those of the leafless Caper. It breeds, I conclude, twice in the year, as I have found its nest in the months of November and March. The nest in two

instances was formed of the flower-stems of the silk-grass, which is abundant in the beds of streams; it was lined with feathers and the silky seeds of the grass; its shape was that of a hollow ball. The largest number of eggs I have found was six, but I see that Col. Sykes found as many as ten. The eggs are very small and of a pure white colour, rather more than $\frac{6}{10}$ ths of an inch long by $\frac{5}{10}$ ths of an inch wide. These little birds are often to be seen on the ground picking up grass-seeds, and so close together that several may be killed at a shot: they do not take long flights, but merely from bush to bush. I saw numbers of them in the leafless Caper on the banks of the river Bheema.

Subfamily FRINGILLINÆ.

Genus PYRGITA, Swain.

PYRGITA DOMESTICA. HOUSE-SPARROW.

Common enough in India. It breeds during the monsoon. I saw them building in the month of August, and its habits, mode of building its nest, &c., are similar to those of the Sparrow at home.

PYRGITA FLAVICOLLIS, Frankl. YELLOW-NECKED SPARROW.

Of the time of breeding or nesting habits I know nothing, but Dr. Jerdon in his Catalogue says, "It is said to breed in holes of trees. The egg is of a greenish-white, much streaked and blotched with purple-brown: I obtained one from the body of a female."

Genus EMBERIZA.

EMBERIZA MELANOCEPHALA, Jerdon.

This handsome Bunting is very common in the Deccan when the grain crops are becoming ripe. The Patel or headman of the town of Jintee, near the river Bheema in the Deccan, assured me that these birds, or some of them, remain to breed in the thick babool copses that clothe the banks of the river near that town, but I did not obtain the nests or eggs. I believe that the greater part migrate much about the same time as the Rose-coloured Pastor.

Subfamily ALAUDINÆ.

Genus ALAUDA.

ALAUDA DEVA, Sykes.

I have some eggs which I believe to be those of this lark, though on account of the similarity of the two or three species that inhabit the Deccan it is very difficult to state this positively. I obtained the eggs on the 11th of September; the nest was composed of a few stems of grass collected together, and forming a very slight receptacle for the eggs. Birds of this species breed twice during the year; I have obtained their eggs during the months of May, September, and October. They lay but two eggs, of a pale mottled brown colour, with a band of the same round the larger end; they are rather more than $\frac{7}{10}$ ths of an inch long by nearly $\frac{6}{10}$ ths of an inch wide.

November 14, 1854.—John Gould, Esq., F.R.S., in the Chair.

ON THE BONES OF THE LEG OF DINORNIS (PALAPTERYX)
STRUTHIOIDES AND THE PALAPTERYX GRACILIS.

BY PROF. OWEN, F.R.S., F.Z.S. ETC.

In my memoir of 1843*, I described two femora of birds from tertiary deposits in New Zealand, agreeing in size with that bone in the Ostrich, and referred them to a species called *Dinornis struthioides*; one of these specimens however consisted only of the shaft; the other and more perfect specimen, figured in pl. 21. fig. 3, was mutilated at both its extremities. I have since received, through the kindness of the Rev. Mr. Colenso, M.A.†, and the Rev. William Cotton, M.A., three entire specimens of femora, ranging between 11 and 12 inches in length, and the shaft of a fourth specimen, of the same species, confirming very satisfactorily that species, and completing our knowledge of the anatomical characters of the bone.

The head is rather more than a hemisphere, more prominent than in the Ostrich, and with a smaller proportion cut off, as it were, from the upper and outer part, and roughened for the attachment of the strong 'ligamentum rotundum.' From the upper part of the base of the head, an almost flat, slightly concave surface ascends, expanding, as it rises, to the broad semicircular ridge which crowns the great trochanter. In the Ostrich that process does not rise beyond the level of the head of the bone. In the *Din. struthioides* the upper trochanterian platform is broader proportionally than in the *Din. casuarinus*‡. The anterior surface of the trochanter is also extensive through the continuation outwards of the great process: it is slightly concave, sculptured by muscular impressions with intervening ridges, and by a defined oval rough tract between the head and the base of the trochanter. The outer convex expanded surface of the trochanter is more strongly marked by the insertions of powerful tendons, surrounding an irregular smooth tract near the centre of the surface. The back part of the upper end of the femur in two of the specimens presents two or three small holes leading into the superficial cancelli, by which it is possible a little air may have been admitted to these cavities; but this is a very feeble representation of the wide orifice and canal at the same part of the Ostrich's femur which conducts directly to the large air cavity in the body of that bone.

The shaft of the entire femur of the *Din. struthioides* repeats the characters described and figured in the memoir above cited. The fore-part of the external condyle begins to rise from the level of the shaft, about one-third from the distal end of the bone, and bends outwards, forwards and downwards, increasing in breadth and convexity, and forming the outer boundary of the characteristic broad rotular surface. The convex fore-part of the inner condyle forming

* Zool. Trans. vol. iii. pp. 247, 249. pl. 21. fig. 3.

† The specimen contributed by this gentleman is cited in the table of admeasurements. Zool. Trans. vol. iii. p. 329.

‡ *Ibid.* pl. 46. fig. 2.

the inner boundary of that surface is shorter, and rises more abruptly. The deep oval fossa, above the vertical broad groove for the fibula, behind the outer condyle, is well marked. The orifice of the medullary artery is at the middle of the back part of the shaft of the femur in two of the specimens.

With regard to the metatarsus of the *Dinornis struthioides*, the same satisfactory confirmation of the species has been received, as in the case of the femur, by the addition of three specimens repeating the characters of the original bone described at p. 240, and figured in pl. 27. fig. 2. of my memoir of 1843. One of these specimens, kindly sent to me by J. R. Gowen, Esq., F.G.S., Sec. H.S., was discovered in the tertiary deposits at Waikawaite, Middle Island of New Zealand, and has the two extremities more entire than in the original specimen figured. The middle of the distal trochlea is impressed by a shallow groove running its whole length, and becoming more shallow as it approaches the contracted back part of the trochlea, which terminates abruptly, projecting beyond the level of the back part of the distal end of the bone.

A second of the additional specimens of the metatarsus of the *Din. struthioides* was obtained by the Rev. Wm. Cotton, M.A., at Tarawaite, in the North Island of New Zealand: a third specimen was discovered by Governor Sir George Grey, in a cave in the district which lies between the river Waikate and Mount Tongariro, in the North Island.

From the same cave Sir George Grey likewise obtained and very liberally transmitted to me, with a most valuable collection of other bones of *Dinornis* and *Palapteryx*, an entire tibia agreeing with the portion of shaft, which, from the dimensions given at vol. iii. p. 329, I was induced to refer to the *Dinornis struthioides*, differing in its size and proportions from all the tibiæ previously described and referred to other species, but presenting similar relations of size to the femur and metatarsus of the *Din. struthioides*, which the previously described tibiæ have presented to the other bones of the leg of the respective species to which those tibiæ have been referred.

I conclude, therefore, that in the tibia transmitted with the metatarsus of the *Din. struthioides* by Sir George Grey, I possess the bone, which I have been so long desirous to obtain in order to complete the leg of the *Din. struthioides*. Like the metatarsus above-cited, it is from the left side, and they appear to have belonged to the same individual bird.

	in.	lin.
The length of this bone is	22	0
The breadth of the proximal extremity	5	6
The breadth of the distal extremity	3	2
The circumference of the middle of the shaft	5	0
The fibular ridge extends down	10	0

This ridge begins, as in the tibiæ of other species of *Dinornis*, below the expanded end of the tibia near the middle of its back part, inclining to its outer side.

In its slender proportions, and the relative positions of the procnemial and ectocnemial ridges, the tibia of the *Dinornis struthioides* agrees with that of the *D. dromioides*.

Description of the Bones of the Leg of the Dinornis gracilis.

The advantage of additional specimens, as confirming, by the repetition of the same characters, a species previously defined, is still greater in respect of the ground which they afford for the discrimination of a distinct but nearly allied species. Notwithstanding the well-marked differences observable between the femur of the *Dinornis struthioides* and the *Dinornis gracilis*, I might have deemed them due to differences of sex or individuals, had I not had evidence of the fixity of the specific characters of the *Dinornis struthioides* by the successive arrivals of additional specimens of its bones. Attending the hoped-for confirmation from such arrivals, it appeared to be most prudent to refrain from announcing a new species of the rapidly increasing family of the great wingless birds of New Zealand until further confirmation might be obtained by corresponding differences in the tibiæ and metatarsi of the two species.

Having had the good fortune at length to obtain these additional illustrations of the *Din. gracilis*, I no longer delay communicating descriptions and figures of them to the learned Society, in whose Transactions my former Memoirs have appeared and have been so liberally illustrated.

Femur.

The following are the chief dimensions of this bone:—

	in.	lin.
Length	11	2
Breadth of proximal end in the axis of the neck	3	10
Breadth transverse of distal end	4	0
Circumference of middle of shaft	4	8

A small portion of the upper ridge of the great trochanter has been broken off: when entire, the femur of the *Din. gracilis* presents the average length of that of the *Din. struthioides*, but it is more slender in proportion, the head is smaller, and is supported by a better-marked constriction or neck, especially at its under part. The upper platform of the trochanter is narrower, the anterior border of the trochanter not being extended so far forwards and outwards. The angle between the upper and fore surfaces of the trochanter is a right one, and they meet at a sharp ridge. The rough oval surface between the head of the femur and the base of the trochanter is smaller than that of the *Din. struthioides*. The outer irregular surface of the trochanter is of much less breadth in the *Din. gracilis*. The muscular impressions at the sides of the shaft meet and form a longitudinal ridge along the back part of the middle third of the shaft: they are separated by a tract of half an inch in the *Dinornis struthioides*, and terminate below in two tuberosities. The corre-

sponding ridge formed by the meeting of the vasti-muscles along the fore part of the shaft is shorter in *Din. gracilis* than in *Din. struthioides*.

The most marked distinction, however, is presented by the distal extremity of the bone, which is not only relatively less expanded in the *Din. gracilis*, but the rotular groove is narrower, and is bounded laterally by condyloid eminences of more nearly equal length; the external one not rising so high up, nor describing the sigmoid curve in descending, as in the *Din. struthioides*. The rotular groove in the *Din. gracilis* is impressed by a transversely oval rough depression, at its upper part, with sharp lateral borders; which depression does not appear in any of the femora of the *Din. struthioides*. The popliteal space is triangular and better defined in the *Din. gracilis*; the fibular groove is shorter and less angular, and the rough deep pit above it is smaller. The tibial surface on the inner condyle is relatively smaller.

Tibia.

The same character is repeated on the proximal end of this bone, where the surface applied to the inner condyle is absolutely smaller than in the *Din. struthioides*, although the entire bone, as shown in the subjoined admeasurements, is longer in the *Din. gracilis*: it is also, as the name of the species implies, more slender in proportion to its length.

	<i>D. gracilis.</i>	
	in.	lin.
The entire length of the bone is	23	6
The transverse breadth of its proximal end	5	2
The transverse breadth of its distal end	2	10
The circumference of the middle of the shaft . .	4	6
The fibular ridge extends down the shaft	9	6

But this ridge commences nearly 3 inches below the back part of the proximal end of the bone, nearer the outer side than in the *D. struthioides*: it is interrupted by an oblique smooth tract at the point indicated in the admeasurement, where the medullary artery penetrates the bone; it then reappears about one inch and a half below the interruption, and soon gradually subsides. This second lower part of a fibular ridge is better marked than in the *Din. struthioides*. The relative size and position of the procnemial and ectocnemial ridges are much the same as in the tibia of the *Din. struthioides* and *Din. dromioides*.

Metatarsus.

The difference between the *Din. struthioides* and the *Din. gracilis* is more obvious at first glance in a comparison of their metatarsi than in that of the above-described bones; especially to an eye accustomed to the comparison of the metatarsi of the different species. The superior length and slenderness of that bone in the *Din. gracilis* would at once prevent its being confounded with the metatarsus of the *Din. struthioides*.

The following are the chief dimensions of the bone in question : those of the extremities being approximative by reason of their worn margins :—

	<i>D. gracilis.</i>	
	in.	lin.
Length of the tarso-metatarsus	13	0
Circumference at the middle of the shaft	4	3
Transverse breadth of proximal end	3	4
Transverse breadth of the distal end	4	3
Breadth of the middle of the shaft	1	7
Thickness or antero-posterior diameter of ditto . .	1	2

The depressed surface for the back toe is better marked than in the *Din. struthioides*.

MISCELLANEOUS.

SHROPSHIRE MOLLUSCA.

To the Editors of the Annals of Natural History.

58 Montagu Square, London,
12th Nov. 1855.

GENTLEMEN,—In the fourth volume of your excellent publication (for 1840) is contained a contribution by Mr. Eyton, under the title of “An Attempt to ascertain the Fauna of Shropshire and North Wales.” It may be interesting to your subscribers and readers in that district, as well as to those naturalists who are desirous of elucidating the question of geographical distribution, if Mr. Eyton’s list of Mollusca were made more complete; and this I have had lately the opportunity of doing, by a month’s residence in the picturesque locality of Stretton in Shropshire. I subjoin a list of species then found by me, but not mentioned by Mr. Eyton :—

<i>Pisidium pulchellum.</i>	<i>Pupa umbilicata.</i>
<i>Zonites alliarius, and var. alba.</i>	<i>Vertigo edentula.</i>
— <i>crystallinus.</i>	— <i>antivertigo.</i>
— <i>nitidus (Bomere).</i>	— <i>pygmæa.</i>
— <i>nitidulus.</i>	— <i>substriata.</i>
— <i>purus, and var. alba.</i>	<i>Clausilia nigricans.</i>
— <i>radiatulus.</i>	<i>Zua lubrica.</i>
<i>Helix aculeata.</i>	<i>Physa fontinalis (Bomere).</i>
— <i>fulva.</i>	<i>Planorbis albus.</i>
— <i>fusca.</i>	<i>Limnæus truncatulus.</i>
— <i>pygmæa.</i>	<i>Carychium minimum.</i>

Being altogether 22, in addition to 32 species of land and fresh-water shells previously recorded by Mr. Eyton as Salopian. The entire list of British species probably contains double the number, or 108.

I may add, that I also found a single specimen of that local species, *Limnæus glaber*, at Bomere.

I am, Gentlemen, yours faithfully,

J. GWYN JEFFREYS.